

**DOES TOURISM POTENTIAL INFLUENCE TOURISM
DEMAND IN THE CARIBBEAN?**

By

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Abstract

This paper seeks to determine whether in a cross section of 29 Caribbean countries an index of relative tourism potential contributes to the explanatory power of traditional price-income demand models. The index of relative tourism potential is derived from the principal component weights of the common characteristics often associated with tourism potential, that is, tourism penetration, density, investment and promotion. The results provide evidence that confirms the importance of the impact of tourism potential on tourism demand across destinations and suggest that, in the face of tourism maturity, corrective action needs to be aggressive to matter and may be of limited utility given that aspects of tourism potential are beyond the control of policy makers in some destinations in the region.

***Keywords:* Tourism Demand, Tourism Maturity**

***JEL:* L83**

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Introduction

The tourism industry is of vital importance to the Caribbean, generating 15% of employment and gross domestic product as well as 18.4% of exports of goods and services (see World Travel and Tourism Council, 2004). In the decade of the 1990s it struggled to keep pace with the growth in world tourism, but in recent years, has experienced some gains, largely reflecting the mounting popularity of the Hispanic Caribbean, whose rate of expansion has overshadowed that witnessed by the small high density islands. Recent research by Whitehall and Craigwell (2005) suggests that the onset of tourism maturity is one possible explanation for the increasing difficulty tourism resorts encounter in attracting visitors over time, and argues for its inclusion when attempting to model tourism demand in the Caribbean. However, tourism maturity cannot be explicitly modelled but indices of relative tourism potential can give insights into likely trends in tourism demand in the future.

The main objective of this paper is to test whether an index of tourism potential adds to the explanatory power of the traditional price-income tourism demand model in a cross section of 29 Caribbean islands. It can be as an extension of the research of Greenidge and Whitehall (2000) and Malcolm (2003) who undertook a similar investigation but utilised time series data and a single indicator of tourism maturity (density) for the countries of Barbados and Jamaica, respectively. This type of analysis is critical in light of the importance of tourism to several destinations in the region and the need for countries with limited potential, particularly the smaller high density tourism destinations, to recognise and adjust to the constraints of rejuvenation strategies given the onset of maturity and related ills, relative to other destinations.

The plan of this paper is as follows: First a select literature review is done on studies of tourism demand, potential and lifecycle. Then a demand model that allows for tourism potential is built. Next the data and methodology used in this paper is presented,

followed by the results of the empirical estimation. The final section examines the significance of the results and summarises the policy implications.

Empirical Literature Review: Tourism Demand, Potential and Life Cycle

There are many available surveys of traditional tourism demand empirical studies for both developed and developing countries (see Song and Witt, 2005). Reviews are also available for the Caribbean (see Greenidge, 1998). As a result, this section will focus on those studies that attempt to incorporate life cycle or maturity features into Caribbean tourism demand functions.

The tourist area lifecycle framework was developed to explain the growth, stagnation and eventual decline of destinations over time after evolving through certain phases (Butler,1980; Cohen,1972; Hovinen,1981). Empirical evidence of the life cycle phenomena in the Caribbean can be found in Wilkinson (1987), Whitehall (1997) and Moore and Whitehall (2005). One of the primary features of the lifecycle model is that as a destination advances along the Butler S-curve, there is increasing difficulty in attracting tourists, despite marketing efforts, because of negative utility from, inter alia, over-utilisation of resources (see Greenidge and Whitehall, 2000). As noted earlier this phenomenon of increasing difficulty of attracting tourists describes the concept of tourism maturity.

In the Caribbean, Greenidge and Whitehall (2000) was the first attempt at explicitly incorporating maturity features into a tourism demand function. They used tourism density (the ratio of total arrivals to population) as a measure of maturity and found that this variable had a negative and significant coefficient, indicating that Barbados was a maturing destination. More recently, Malcolm (2003) undertook a similar study for Jamaica using the same maturity variable and found that, like Barbados, Jamaica has a mature tourism product. These results provide tentative evidence that seems to confirm the implication of life cycle studies that the maturity of a destination may alter the demand for the tourism product, irrespective of price or income factors.

Building a Tourism Demand Model with Tourism Potential

Greenidge and Whitehall (2000) have found that the standard price-income models may not be very applicable to the Caribbean. They suggest that in building tourism demand models one should include a combination of income and price factors, on the one hand, and a combination of externality or non-price factors related to tourism maturity characteristics on the other, where the latter factors can lead to shifts in demand over time. Using a constrained utility optimisation Lagrange framework, Greenidge and Whitehall (2000) developed one such model in their study of Barbados, which was consequently adapted by Malcolm (2003) for Jamaica. It is this set up that is employed in this paper.

The general specification of the tourism demand function is as follows:

$$\text{ARGROWTH} = f(\text{TWEXGRO}, \text{TWINGRO}, \text{INFLATION}, \text{POTENTIAL}) \quad (1)$$

-/+ + - +

where ARGROWTH is the growth in arrivals, TWEXGRO is the growth in the trade weighted exchange rate relative to tourists in the units of the destination currency. TWINGRO is the growth in the trade weighted income of source markets, INFLATION is the cumulative change in the consumer price indices (CPIs), and POTENTIAL is the relative tourism potential index which is a weighted average of DENSITY (tourism arrivals divided by land in square kilometers), PENETRATION (tourism arrivals over visitor expenditure per unit of population in millions), PROMOTION (expenditure by the national tourism organisation) and INVESTMENT (growth of rooms in tourism accommodation).

The signs underneath the variables indicate the partial derivatives. The first three are standard and need little explanation. . The sign on the coefficient of TWEXGRO should be indeterminate because it reflects the average exchange rate of several source countries whose rates often vary in different directions, for example, the Canadian dollar and the Euro. The parameter on the TWINGRO variable is expected to be positively signed because higher source market income should result in a greater tendency to travel,

ceteris paribus. The sign on the INFLATION coefficient is likely to be negative since higher inflation in the destination should reduce the propensity to travel to that destination. With respect to the sign on the index of tourism potential, a few points must be made. First, it is assumed that as the potential of a country's tourism increases (or is less mature) tourist arrivals should expand. However, there may exist a critical point where as a destination's tourism potential grows (or the country's tourism product becomes more mature), tourist arrivals fall. Hence it is possible that the impact of tourism potential on tourism demand is non-linear, which can be captured by including POTENTIAL and its square in Equation (1). Examining the components of tourism potential can make this non-linear influence more clear. Consider for example, the penetration ratio and the promotion impact. It is commonly assumed that as the ratio of tourists to the resident population rises beyond some critical point, as yet unobserved, it will become more difficult to attract additional numbers of tourists to a given destination for social, environmental, psychological, political or other reasons related to the likelihood of eventual negative impacts on the resident community. With respect to promotion, the life cycle concept assumes a lower impact of each dollar of promotional expenditure in terms of the corresponding value of visitor expenditure realised as visitors, beyond some point, gradually decrease their length of stay in an expanding un-attractive destination and/or as hoteliers discount room rates in an attempt to attract larger numbers of visitors, or hotels accommodate tourists of relatively lower spending power over time. More details on these non-linear relationships can be found in Whitehall and Craigwell (2005).

Data, Methodology and Results

Data

In this study, the Caribbean includes the Central American territory of Belize and the South American territory of Guyana that are part of the Caribbean Common Market. Suriname is excluded owing to data deficiencies. Some studies of the region also incorporate tourism resorts in Mexico and Venezuela, but these are omitted here due to their vast size and population relative to the Caribbean Islands.

Data for the 29 Caribbean countries analysed in this study was sourced from the Caribbean Tourism Organisation's *Statistical Report 2000 Edition* and then standardised to ensure commensurability. ARGROWTH is arrivals in 2000 divided by arrivals in 1995. TWINGRO is the growth rate of the trade-weighted income of the main source markets. It is based on the income growth of the United States (US), Canada and Europe (including the United Kingdom) between 1995 and 2000, weighted by the relative importance of tourist arrivals from these source markets in 2000. TWEXGRO is the trade weighted exchange rate of destinations. It is calculated as the average value to tourists of their currencies (US, Canada and the European Union) between 1995 and 2000 in units of domestic currency weighted by the relative importance of tourist arrivals from these source markets in 2000. INFLATION is a proxy for tourism prices in each destination computed as the cumulative growth in the CPIs between 1995 and 2000. Tourism potential (POTENTIAL) is a weighted index of DENSITY, PENETRATION, PROMOTION and INVESTMENT with the weights determined by the procedure of principal components (see Whitehall and Craigwell, 2005). The tourism penetration ratio defined as arrivals in 2000 divided by population (in millions) is used as a proxy for tourism interaction. Ordinarily, bed nights would be preferred to arrivals as the former is a superior measure of tourism product. However, data on bed nights was not available. The tourism density ratio, defined as arrivals in 2000 over land area suitable for tourism, is used as a measure for tourism carrying capacity. For most countries, except Belize and Guyana, it was taken that land available for tourism was the total land area due to their small size and reasonably accessible surface. However, for Guyana and Belize that have vast inaccessible regions, total land area was scaled down by the proportion of the coastal line to perimeter using a factor of $\frac{1}{6}$ and $\frac{1}{2}$ respectively to ensure comparability with island destinations. It is noteworthy that this study distinguishes between tourism penetration and tourism density, contrary to some researchers who either do not make the distinction or consider both characteristics as being part of tourism carrying capacity (see Gill and Williams, 2001).

The growth rate of rooms in accommodation over the five-year period 1995-2000 was used as a proxy for tourism investment. Five years is chosen to rule out the possibility of shocks like September 11, distorting characteristics of the tourism industry.

Tourism promotional impact is defined as tourism visitor expenditure divided by promotional budgets of the National Tourism Organisation, where the latter includes spending on administration, advertising, marketing and research but excludes spending on infrastructure and other services. Estimates of expenditure by the National Tourism Organisations of Cuba and the Dominican Republic are derived from the World Travel and Tourism Council Report of 2004.

The cut off point for the data is 2000 for two reasons: (i) information for the period 2001-2002 may be contaminated due to worldwide shock of the terrorist attacks of September 11, and (ii) data for 2003 was not available for most of the countries in the study. The summary statistics of the data is given in Table 1.

Methodology and Results

As the data employed is cross sectional, the method used to estimate the tourism demand models is Ordinary Least Squares with White adjusted heteroscedasticity standard errors. These results, computed using Eviews 5 software programme, are presented in Table 2. Column 2 shows the tourism demand model that includes only the usual price and income factors. The model is not well explained by the data as all of the explanatory variables are statistically insignificant with a negative adjusted R square.

In Column 3 the potential index is included with the standard price-income variables. The result implies that this index is statistically insignificant and does not appreciably improve the fit of the model. To examine this index further, column 4 shows the case where the index's components are added to the standard model. The explanatory power of the model increases to nearly 48 per cent with the coefficients on investment and promotion being positive and statistically significant at the 1 per cent level. Also the exchange rate is now statistically significant at the 10 per cent level. As mentioned earlier, the negative sign of the coefficient reflects the fact that the variable represents the often-countervailing impact of various currencies floating against each other.

In column 5, the index of tourism potential is added to the standard price-income model in a non-linear fashion to indicate that there is a threshold where a further increase in tourism potential creates diminishing returns to tourism demand. The incorporation of

this variable improves the fit of the model, with the adjusted R square expanding by about 15 percent and a simple F-test showing that the inclusion of the non-linear potential variables cannot be rejected. The tourism potential index has the expected significant non-linear effects. Moreover, adding this variable seems to have a positive impact on the traditional price-income factors, especially the parameter of the exchange rate, which becomes statistically significant at the 10 per cent level.

To see which non-linear component of the tourism potential index is most influential, the index is disaggregated into its four indicators and incorporated in the demand specification (see column 6). The final column (column 7), which depicts column 6 with all the insignificant variables deleted, is the preferred model (judging by the relatively higher adjusted R square of 0.52). From this column, it appears that density and investment are the variables with the significant non-linear influence. Consistent with the results above, promotion is significant with only a linear impact, and penetration does not seem to have any statistically significant effect at all. These findings, though not fully collaborating the life cycle impact for all the tourism potential indicators, are encouraging. Recent work by Moore and Whitehall (2005) suggest that there could be different life cycles in the same destination induced by the peculiarities of the source markets. Thus, an avenue for future research could be in developing a tourism demand model that includes indices of potential, for each source market.

It is noteworthy that several of the significant variables impacting on tourism demand are mostly beyond the control of the tourism authorities, for example, the exchange rate effect on the value of the tourists' dollar, and exogenous factors such as the trend in the income level of tourists and the eventual negative influence of increasing density of tourists to land area. With respect to the exchange rate, Caribbean governments like Barbados, Cuba, Belize, Bermuda, the Bahamas and those of the Organisation of Eastern Caribbean States (OECS) have shown great reluctance to depreciate their currencies merely to offer tourists more competitive prices. This is because of the perceived negative impact on other industries and concern about the relevance of currency float to small open economies with limited supply capacity. In countries such as Trinidad and Tobago where the tourism sector is small in relation to gross domestic product, a managed float arrangement exists partly as a result of the lack

of conviction that it is useful to adopt an exchange rate mechanism merely to support tourism. In some of the floating rate countries, the flexible exchange rate arrangement has not strengthened the economies appreciably owing to exogenous factors such as crime. In other countries, for instance, the US and British Virgin Islands, as well as the Turks and Caicos there are administrative impediments to a change in the exchange rate.

Conclusions

Traditional models of tourism demand that have focused on income and price factors are of limited utility in the Caribbean since they need to be modified for tourism phenomena related to tourism potential and related externalities. This paper provides some evidence that suggests that in the Caribbean indices of relative tourism potential contribute to the explanatory power of traditional price-income demand models. The significance of the results is the provision of a basis for modeling the impact of tourism potential on demand across destinations and confirming the implication of life cycle studies that maturity of a destination alters the demand for the tourism product irrespective of price-income factors. Thus in the face of maturity, corrective action needs to be aggressive to matter and may be of limited use given that aspects of tourism potential are beyond the control of policy makers in the region. Even those factors like tourism investment and promotion that are largely under the purview of tourism authorities are to some degree subject to Governments' resource constraints, and in some cases, other important priorities such as poverty alleviation, education, crime and defense spending.

References

- Butler, R.W.; The Concept of a Tourism Area Cycle of Evolution: Implications for Management Resources, *The Canadian Geographer*, Vol. 24, 1980, pp. 5-16.
- Cohen, E.; Toward a Sociology of International Tourism, *Social Research*, Vol. 39, 1972, pp. 164-82.
- Gill A. and P.W. Williams; Tourism Carrying Capacity Management Issues, in *Global Tourism*, William F. Theobald (Editor), Butterworth Heinmann, Oxford, 2001, pp. 230-46.
- Greenidge, K.; Forecasting Tourism Demand in Barbados, Central Bank of Barbados Working Paper, 1998, pp.167-77.
- Greenidge K. and P. Whitehall; Tourism Maturity and Demand, in *Empirical Studies in Caribbean Economy*, A. Maurin and P. Watson, (Editors), Caribbean Centre for Monetary Studies, Vols. 5 & 6, 2000, pp. 161-189.
- Hovinen, G.R.; A Tourism Cycle in Lancaster County, Pennsylvania, *The Canadian Geographer*, Vol. 25, 1981, pp. 283-286.
- Malcolm, O.; Tourism Maturity and Demand: Jamaica, Bank Of Jamaica, mimeo, August, 2003.
- Moore, W.R. and P. H.Whitehall;The Tourist Area Lifecycle and Regime Switching Models, *Annals of Tourism Research*, Vol. 32, No. 1, 2005, pp.
- Song, G. L. and S. F. Witt; Research Developments in Econometric Modelling and Forecasting, *Journal of Travel Research*, August, Vol.44, No.1, 2005, pp. 82-99.
- Whitehall P.H.; Challenges for Long-stay Tourism beyond 2000, in *Central Banking in Barbados: Reflections and Challenges*, H. Codrington, R. Craigwell and C. Haynes, (Editors), Central Bank of Barbados, 1997, pp 151-180.
- Whitehall, P.H. and R. Craigwell; Tourism Maturity and a Ranking of Relative Tourism Potential in the Caribbean, *Central Bank of Barbados Economic Review*, Vol.XXXII, No.2, September, 2005, pp. 28-42.
- Wilkinson, P.F.; Tourism in Small Island Nations: A Fragile Dependence, *Leisure Studies*, Vol. 6, 1987, pp. 127-140.
- World Travel and Tourism Council; *The Caribbean: The Impact of Travel and Tourism on Jobs and the Economy*, World Travel and Tourism Council Report, 2004.

Table 1**Descriptive Statistics**

	ARGROWTH	TWEXGRO	TWINGRO	INFLATION	INVESTMENT	DENSITY	PENETRATION	PROMOTION	POTENTIAL
Mean	1.160600	0.953386	1.177930	1.197884	1.172788	1161.389	3.270483	1.000000	6059.087
Median	1.150413	0.959901	1.178228	1.126468	1.122201	312.2677	1.809000	0.911634	4813.343
Maximum	2.325947	1.226653	1.205404	1.987283	1.894195	12714.47	14.12700	2.539554	21754.07
Minimum	0.581921	0.774221	1.122444	1.044752	0.371831	2.080556	0.019000	0.227552	2024.979
Std. Dev.	0.359020	0.103020	0.022622	0.205064	0.286118	2567.832	3.624196	0.602856	4207.226
Skewness	1.387964	0.557026	-0.645581	2.629506	0.029042	3.545043	1.431055	1.055206	2.026161
Kurtosis	5.689336	3.435028	2.651703	9.842919	4.396670	15.66643	4.244075	3.284947	7.746433
Jarque-Bera	18.05045	1.728352	2.160994	89.99998	2.361158	254.6053	11.76844	5.479836	47.06451
Probability	0.000120	0.421399	0.339427	0.000000	0.307101	0.000000	0.002783	0.064576	0.000000

Table 2:

**Statistical Analysis of the Determinants of Tourism
Potential in 29 Caribbean Countries**

Variables	Eqn1	Eqn2	Eqn3	Eqn4	Eqn5	Eqn6
C	4.605 (3.618)	5.458 (3.412)	3.707 (2.499)	5.621 (3.336)	3.654 (2.819)	5.702 (2.776)
TWEXGRO	-1.037 (0.852)	-1.430 (0.966)	-1.672*** (0.856)	-1.660*** (0.979)	-2.079*** (1.031)	-2.158 (0.969)**
TWINGRO	-2.597 (2.907)	-3.277 (2.651)	-2.192 (2.130)	-3.541 (2.538)	-2.674 (2.407)	-4.300 (2.378)***
INFLATION	0.504 (0.447)	0.652 (0.481)	0.496 (0.305)	0.683 (0.470)	0.622 (0.383)	0.733 (0.377)***
POTENTIAL		2.39E-05 (2.43E-05)		0.0001* (4.25E-05)		
POTENTIAL^2				-4.54E-09* (1.61E-09)		
DENSITY			3.95E-06 (2.11E-05)		0.0001 (7.64E-05)	7.74E-05*** (4.97E-05)
PROMOTION			0.276* (0.09)		0.463 (0.294)	
PENETRATION			-0.003 (0.015)		-0.006 (0.058)	
INVESTMENT			0.661* (0.201)		1.831* (0.706)	2.004* (0.746)
DENSITY^2					-9.69E-09*** (5.09E-09)	-7.49E-09** (3.74E-09)
PROMOTION^2					-0.031 (0.112)	0.135* (0.037)
PENETRATION^2					-0.0007 (0.003)	
INVESTMENT^2					-0.478 (0.315)	-0.593 (0.331)***
Adjusted R ²	-0.006	0.029	0.470	0.140	0.478	0.517

Note: Numbers in parentheses are White Heteroscedasticity – Consistent Standard Errors
*, **, and *** indicate significant at the 1, 5, 10 percent level, respectively.